

The following Listing of the Claims replaces all prior Listings of the Claims within this application.

LISTING OF THE CLAIMS

Claims 1 – 25 (Cancelled)

Claim 26 (New) A method of fabricating a silicon-on-insulator (SOI) substrate having a uniform buried oxide layer, said method comprising:

forming a porous silicon containing region having a porosity of about 0.01% or greater in an upper portion of a Si-containing substrate;

forming a single crystal Si-containing layer directly on top of said porous silicon containing region by epitaxial deposition;

forming an oxygen implant region by implanting oxygen atoms into said wafer, wherein the oxygen peak is located within said porous silicon containing region or at an interface between said single crystal Si-containing layer and said porous silicon containing region; and

annealing said wafer using a thermal oxidation process at a temperature at which said implanted oxygen precipitates as oxides, wherein said precipitated oxides combine to form a uniform buried oxide layer extending across an entirety of a semiconductor-on-insulator (SOI) wafer, wherein said porous silicon containing region includes voids that are located beneath said uniform buried oxide layer after said annealing, wherein a variation of thickness of said uniform buried oxide layer across said entirety of said SOI wafer is less than 30% of a total thickness of said uniform buried oxide layer, and wherein a Si-containing over-layer is formed from a remaining portion of said single crystal Si-containing layer.

Claim 27 (New) The method of Claim 26, wherein some pores in said porous silicon containing region are consumed during said thermal oxidation process and other pores in said porous silicon containing region collapse into said voids beneath said uniform buried oxide layer during said annealing.

Claim 28 (New) The method of Claim 26, wherein said porous silicon containing region is formed by porous silicon electrolytic anodization of an exposed surface of said Si-containing substrate.

Claim 29 (New) The method of Claim 26, further comprising annealing said silicon-on-insulator structure in a hydrogen containing ambient after said thermal oxidation process, wherein a level of dopant atoms in said Si-containing over-layer is reduced during said annealing in said hydrogen containing ambient.

Claim 30 (New) The method of Claim 26, wherein an oxygen dose of about 1E17 atoms/cm² or less is employed during said implanting of said oxygen atoms, and wherein said uniform buried oxide layer has a thickness of about 100 nm or less.

Claim 31 (New) A method of fabricating a silicon-on-insulator (SOI) substrate having a plurality of uniform buried oxide regions, said method comprising:

forming a porous silicon containing region having a porosity of about 0.01% or greater in an upper portion of a Si-containing substrate;

forming a single crystal Si-containing layer directly on top of said porous silicon

containing region by epitaxial deposition;

forming a plurality of patterned oxygen implant regions by implanting oxygen atoms into said wafer, wherein the oxygen peak is located within said porous silicon containing region or at an interface between said single crystal Si-containing layer and said porous silicon containing region; and

annealing said wafer using a thermal oxidation process at a temperature at which said implanted oxygen precipitates as oxides, wherein said precipitated oxides combine to form a plurality of uniform buried oxide regions, wherein said porous silicon containing region includes voids that are located beneath said uniform buried oxide layer after said annealing, wherein a Si-containing over-layer is formed from a remaining portion of said single crystal Si-containing layer, and wherein said porous silicon containing region abuts said single crystal Si-containing layer around said plurality of uniform buried oxide regions.

Claim 32 (New) The method of Claim 31, wherein some pores in said porous silicon containing region are consumed during said thermal oxidation process, and other pores in said silicon containing region collapse into said voids beneath said plurality of uniform buried oxide regions during said annealing.

Claim 33 (New) The method of Claim 31, wherein said porous silicon containing region is formed by porous silicon electrolytic anodization of an exposed surface of said Si-containing substrate.

Claim 34 (New) The method of Claim 33, further comprising annealing said silicon-on-insulator

structure in a hydrogen containing ambient after said thermal oxidation process, wherein a level of dopant atoms in said Si-containing over-layer is reduced during said annealing in said hydrogen containing ambient.

Claim 35 (New) The method of Claim 33, wherein an oxygen dose of about 1E17 atoms/cm² or less is employed during said implanting of said oxygen atoms, and wherein said uniform buried oxide layer has a thickness of about 100 nm or less.

Claim 36 (New) A method of fabricating a silicon-on-insulator (SOI) substrate having voids beneath at least one uniform buried oxide region, said method comprising:

forming a porous silicon containing region having a porosity of about 0.01% or greater in an upper portion of a Si-containing substrate;

forming a single crystal Si-containing layer directly on top of said porous silicon containing region by epitaxial deposition;

forming at least one oxygen implant region by implanting oxygen atoms into said wafer, wherein the oxygen peak is located within said porous silicon containing region or at an interface between said single crystal Si-containing layer and said porous silicon containing region; and

annealing said wafer using a thermal oxidation process at a temperature at which said implanted oxygen precipitates as oxides, wherein said precipitated oxides combine to form at least one uniform buried oxide region during said annealing, wherein some pores in said porous silicon containing region collapse into voids beneath said at least one uniform buried oxide regions during said annealing, wherein said porous silicon containing region includes said voids that are located beneath said uniform buried oxide layer after said annealing, and wherein a Si-

containing over-layer is formed from a remaining portion of said single crystal Si-containing layer.

Claim 37 (New) The method of Claim 36, wherein pores in said porous silicon containing region are consumed during said thermal oxidation process.

Claim 38 (New) The method of Claim 37, wherein said at least one uniform buried oxide region is a uniform buried oxide layer that extends across an entirety of a semiconductor-on-insulator (SOI) wafer, and wherein a variation of thickness of said uniform buried oxide layer across said entirety of said SOI wafer is less than 30% of a total thickness of said uniform buried oxide layer.

Claim 39 (New) The method of Claim 36, wherein said at least one uniform buried oxide region is a plurality of uniform buried oxide regions, wherein a Si-containing over-layer is formed from a remaining portion of said single crystal Si-containing layer, and wherein said porous silicon containing region abuts said single crystal Si-containing layer around said plurality of uniform buried oxide regions.

Claim 40 (New) The method of Claim 39, wherein said porous silicon containing region is formed by porous silicon electrolytic anodization of an exposed surface of said Si-containing substrate.

Claim 41 (New) The method of Claim 36, further comprising annealing said silicon-on-insulator structure in a hydrogen containing ambient after said thermal oxidation process, wherein a level

of dopant atoms in said Si-containing over-layer is reduced during said annealing in said hydrogen containing ambient.

Claim 42 (New) The method of Claim 36, wherein an oxygen dose of about 1E17 atoms/cm² or less is employed during said implanting of said oxygen atoms, and wherein said uniform buried oxide layer has a thickness of about 100 nm or less.